

WHAT IS CLAIMED IS:

- 1 1. A field effect transistor having reduced reverse body effects and reduced parasitic
2 junction capacitance comprising:
 - 3 a bulk silicon substrate;
 - 4 a first source/drain region having a first depletion region associated therewith formed in
5 said bulk silicon substrate;
 - 6 a second source/drain region having a second depletion region associated therewith
7 formed in said bulk silicon substrate;
 - 8 a channel region separating said first and second source/drain regions;
 - 9 a merged depletion region defined in said bulk silicon substrate, and under said channel
10 region and between said first and second source/drain regions by merging said first and second
11 depletion regions; and
 - 12 a gate member formed over said channel region.
- 1 2. The field effect transistor of claim 1 wherein said merged depletion region is a fully
2 merged depletion region.
- 1 3. The field effect transistor of claim 1 wherein said merged depletion region has an ion
2 implantation density of between about E^{12}/cm^2 to about $5E^{13}/\text{cm}^2$.
- 1 4. The field effect transistor of claim 1 further comprising a pair of shallow trench isolation
2 (STI) regions for isolating said field effect transistor.

1 5. The field effect transistor of claim 1 wherein said regions comprise first and second
2 source/drain regions formed by optimally grading said source/drain regions to fully merge said
3 depletion regions.

1 6. A multiplicity of field effect transistors having reduced reverse body effects and reduced
2 parasitic junction capacitance, each of said multiplicity of field effect transistors comprising:

3 a bulk silicon substrate

4 a first source/drain region having a first depletion region associated therewith formed in
5 said bulk silicon substrate;

6 a second source/drain region having a second depletion region associated therewith
7 formed in said bulk silicon substrate;

8 a channel region formed in said bulk silicon substrate separating said first and second
9 source/drain regions;

10 a merged depletion region defined in said bulk silicon substrate under said channel region
11 and between said first and second source/drain regions by merging said first and second
12 depletion regions;

13 a gate member formed over said channel region; and

14 a multiplicity of shallow trench isolation (STI) regions separating said multiplicity of
15 field effect transistors from each other.

1 7. The multiplicity of field effect transistors of claim 6 wherein said merged depletion
2 region has an ion implantation density of between about E^{12}/cm^2 to about $5E^{13}/\text{cm}^2$.

1 8. A method of manufacturing field effect transistors having reduced reverse body effects
2 and reduced parasitic capacitance on a bulk silicon substrate comprising the steps of:

3 providing a bulk silicon substrate;
4 forming a multiplicity of source/drain region pairs, each separated by a channel region in
5 said bulk silicon and having a depletion region associated therewith;
6 merging said depletion regions of said source/drain pairs by selective ion implantation;
7 and
8 depositing a control gate over said channel region.

1 9. The method of claim 8 wherein said first and second source/drain regions are graded
2 source/drain regions and wherein said step of ion implantation comprises the step of ion
3 implanting said graded first and second source/drain regions in an optimal pattern and with an
4 optimal density to merge said depletion regions.

1 10. The method of claim 8 wherein said step of merging said depletion region comprises the
2 step of implanting ions at a density of between about E^{12}/cm^2 and about $5E^{13}/\text{cm}^2$.

1 11. The method of claim 8 wherein said step of merging comprises the step of fully merging
2 said depletion regions.